# 1985 *Journal of Spacecraft and Rockets* Index

## How to Use the Index

In the Subject Index, pages 672-675, each technical paper is listed under a maximum of three appropriate headings. Note the number in boldface type following each paper title, and use that number to locate the paper in the Chronological Index. The Author Index, page 676, lists all authors associated with a given technical paper. The locating numbers are identical to those in the Subject Index. The Chronological Index, pages 677-680, lists all papers by their unique code numbers. This listing contains titles, authors and their affiliations, and volume, issue number, and page where the paper appeared. It also gives the AIAA paper number, if any, on which the article was based, as well as the "CP" or conference volume number if the paper was published in a bound collection of meetings papers. Comments, Replies, and Errata are listed directly beneath the paper to which they refer. If the paper to which they refer was published prior to 1985, that paper also will appear in both the Subject and Chronological Indexes. Authors of Comments also are listed in the Author Index.

# Subject Index


## Aircraft Technology, Conventional, STOL/VTOL

### *Aerodynamics*

Drag Reduction of Perforated Axisymmetric Bodies in Supersonic Flow A85-102
Missile Aerodynamics Prediction Code A85-093
Turbulent Reynolds Analogy Factors for Nonplanar Surface Microgeometries A85-088

### *Deceleration Systems*

Comparison of Theoretical and Experimental Performance of a 6.44-ft-diam Parachute A85-100

### *Fuels and Fuel Systems*

Deposit Formation and Heat-Transfer Characteristics of Hydrocarbon Rocket Fuels A85-087
Liquid Management in Low Gravity Using Baffled Rotating Containers A85-042

### *Simulation*

Supersonic Wind Tunnel Simulation of Propulsive Jets A85-080

### *Structural Design (including Loads)*

Optimum Design of Dewar Supports A85-066

### *Testing, Flight and Ground*

Effects of Spin and Mass Addition on High-Angle-of-Attack Re-entry A85-008

## Energy

### *Lasers*

Radiation Energy Receiver for Solar Propulsion Systems A85-098

### *Microwaves*

Starwisp: An Ultra-Light Interstellar Probe A85-051

### *Solar Power Satellites*

Radiation Energy Receiver for Solar Propulsion Systems A85-098

### *Solar Thermal Power*

Effect of Contact Spacing on Efficiency of Flat-Plate Solar Collectors A85-090

## Fluid Dynamics

### *Aeroacoustics*

Structural Response and Acoustic Fatigue for Random Progressive Waves and Diffuse Fields A85-050

### *Boundary Layers and Convective Heat Transfer-Laminar*

Measurement of Energy Distribution in Flowing Hydrogen Microwave Plasmas A85-096
Shock-Interaction-Induced Heat Transfer to the Orbiter Wing Lower Surface A85-078
Engineering Flowfield Method with Angle-of-Attack Applications A85-061

### *Boundary Layers and Convective Heat Transfer-Turbulent*

Turbulent Reynolds Analogy Factors for Nonplanar Surface Microgeometries A85-088
Engineering Flowfield Method with Angle-of-Attack Applications A85-061

### *Computational Methods*

Effects on Nonequilibrium and Wall Catalysis on Shuttle Heat Transfer A85-074
Analysis of Two-Phase Flow Processes in Rocket Exhaust Plumes A85-055
Comparison of Inviscid Flow Computations with Flight Data for the Shuttle Orbiter A85-044
Analytical Model of Pulsing of Solid Propellant Rocket Motors A85-029
Real-Gas Flowfields about Three-Dimensional Configurations A85-005

### *Hydrodynamics*

Liquid Management in Low Gravity Using Baffled Rotating Containers A85-042

### *Jets, Wakes, and Viscid-Inviscid Flow Interactions*

Supersonic Wind Tunnel Simulation of Propulsive Jets A85-080
Shock-Interaction-Induced Heat Transfer to the Orbiter Wing Lower Surface A85-078
Analysis of Two-Phase Flow Processes in Rocket Exhaust Plumes A85-055
Aeroelastic Characteristics of the Space Shuttle External Tank Cable Trays A85-043
Mitigation of Scattered Solar Radiation from Condensed Attitude Control Jet Plumes A85-031

### *Multiphase Flows*

Analysis of Two-Phase Flow Processes in Rocket Exhaust Plumes A85-055
Mitigation of Scattered Solar Radiation from Condensed Attitude Control Jet Plumes A85-031

### *Nonsteady Aerodynamics*

Compressible Flow in a Long Tube Closed at One End A85-101
Aeroelastic Characteristics of the Space Shuttle External Tank Cable Trays A85-043

### *Nozzle and Channel Flow*

Low-Thrust $LO_2/LH_2$ Engine Performance with a 300:1 Nozzle A85-027

### *Plasmadynamics and MHD*

Inert Gas Test of Two 12-cm Magnetostatic Thrusters A85-022

### *Rarefied Flows*

Shuttle Orbiter High Resolution Accelerometer Package Experiment: Preliminary Flight Results A85-072

### *Reactive Flows*

Effects on Nonequilibrium and Wall Catalysis on Shuttle Heat Transfer A85-074
Recession Behavior of Graphitic Nozzles in Simulated Rocket Motors A85-060
Real-Gas Flowfields about Three-Dimensional Configurations A85-005

### *Shock Waves and Detonations*

Ignition/Duct Overpressure Induced by Space Shuttle Solid Rocket Motor Ignition A85-073

### *Subsonic Flow*

Turbulent Reynolds Analogy Factors for Nonplanar Surface Microgeometries A85-088

### *Supersonic and Hypersonic Flow*

Drag Reduction of Perforated Axisymmetric Bodies in Supersonic Flow A85-102
High-Altitude Effects on Three-Dimensional Nonequilibrium Viscous Shock-Layer Flows A85-094
Comparative Analysis of Numerical Schemes for Hypersonic Re-entry Flows A85-082
Comparison of Inviscid Flow Computations with Flight Data for the Shuttle Orbiter A85-044
Aerodynamics of Generalized Bent Biconics for Aero-Assisted, Orbital-Transfer Vehicles A85-014
Three-Dimensional Nonequilibrium Viscous Flow over the Shuttle Orbiter with Catalytic Surface Effects A85-013
Chemical Nonequilibrium Effects on Flowfields for Aeroassisted Orbital Transfer Vehicles A85-006
Radiation Enhancement by Nonequilibrium in Earth's Atmosphere A85-003

### *Transonic Flow*

Surface Pressure Measurements on a Transonic Spinning Projectile A85-015

### *Viscous Nonboundary-Layer Flows*

Three-Dimensional Nonequilibrium Viscous Flow over the Shuttle Orbiter with Catalytic Surface Effects A85-013

### *Wave Motion and Sloshing*

Liquid Management in Low Gravity Using Baffled Rotating Containers A85-042

## Interdisciplinary Topics

### *Aerospace Technology Utilization*

Payload Piggybacking Aboard Shuttle Solid Rocket Booster A85-104

### *Analytical and Numerical Methods*

Example Solar Electric Propulsion System Asteroid Tours Using Variational Calculus A85-048
Spacecraft Discharge Electromagnetic Interference Coupling Models A85-040
Three-Dimensional Transient Heat Conducton in a Multilayer Medium A85-030
Analytic Solution for a Cruising Plane Change Maneuver A85-018

### *Astrodynamics*

Path-Constrained Maneuvering Near Large Space Structures A85-083
Charging of Large Structures in Space with Application to the Solar Sail Spacecraft A85-038

***Atmospheric and Space Sciences***

An Auroral X-Ray Imaging Spectrometer A85-077
The Shuttle Environment: Gases, Particulates, and Glow A85-075
Spacecraft Discharge Electromagnetic Interference Coupling Models A85-040
Experiments in Charge Control at Geosynchronous Orbit - ATS-5 and ATS-6 A85-039
Dynamics of Magnetospheric Plasmas A85-036

***Numerical Analysis***

A Nine-Noded Quadratic Control-Volume-Based Finite Element for Heat Conduction A85-079
Three-Dimensional Transient Heat Conducton in a Multilayer Medium A85-030

***Reliability, Maintainability, and Logistics Support***

Estimate of the Probability of a Lightning Strike to the Galileo Probe A85-034

***Satellite Communication Systems (including Terrestrial Stations)***

Precision of Mesh-Type Reflectors for Large Space-Borne Antennas A85-010

***Space Processing***

Frequency Characteristics of a Bubble Cluster in a Vibrated Liquid Column A85-099

## Launch Vehicle and Missile (LV/M) Technology

***Aerodynamic Heating and Ablation***

Experimental Aerodynamic Heating to Simulated Shuttle Tiles A85-064
Aerothermodynamic Design of High Speed Rockets A85-046

***Aerodynamics***

Drag Reduction of Perforated Axisymmetric Bodies in Supersonic Flow A85-102
Missile Aerodynamics Prediction Code A85-093
Extension of Equivalent Angle-of-Attack Method for Nonlinear Flowfields A85-045
Predicting the Supersonic Aerodynamics of Very-Low-Aspect-Ratio Lifting Surfaces A85-016
Surface Pressure Measurements on a Transonic Spinning Projectile A85-015

***Configurational Design***

Alternative Designs of Integral Tanks for Advanced Space Transportation Systems A85-065
Structural Concepts for Future Space Transportation System Orbiters A85-049
Predicting the Supersonic Aerodynamics of Very-Low-Aspect-Ratio Lifting Surfaces A85-016

***Launch Vehicle Systems***

Effects of Tripropellant Engines on Earth-to-Orbit Vehicles A85-095
Alternative Designs of Integral Tanks for Advanced Space Transportation Systems A85-065

***Missile Systems***

Compressible Flow in a Long Tube Closed at One End A85-101
Effects of Spin and Mass Addition on High-Angle-of-Attack Re-entry A85-008

***Mission Studies and Economics***

Payload Piggybacking Aboard Shuttle Solid Rocket Booster A85-104
Aries Rocket Motor Infrared and Ultraviolet Spent-Stage Emission A85-086

***Propulsion and Propellant Systems***

Effects of Tripropellant Engines on Earth-to-Orbit Vehicles A85-095
Deposit Formation and Heat-Transfer Characteristics of Hydrocarbon Rocket Fuels A85-087
Ignition/Duct Overpressure Induced by Space Shuttle Solid Rocket Motor Ignition A85-073
Effects of an S-Inlet on the Flow in a Dump Combustor A85-035
Dynamic Response of the LE-5 Rocket Engine Liquid Oxygen Pump A85-028
Low-Thrust $LO_2/LH_2$ Engine Performance with a 300:1 Nozzle A85-027

***Sounding Rocket Systems***

Payload Piggybacking Aboard Shuttle Solid Rocket Booster A85-104
Compressible Flow in a Long Tube Closed at One End A85-101
Aries Rocket Motor Infrared and Ultraviolet Spent-Stage Emission A85-086
Aerothermodynamic Design of High Speed Rockets A85-046

***Structural Design (including Loads)***

Alternative Designs of Integral Tanks for Advanced Space Transportation Systems A85-065
Natural Environment Considerations for Space Shuttle System Development Support A85-053
Structural Concepts for Future Space Transportation System Orbiters A85-049

***Testing, Flight and Ground***

Surface Pressure Measurements on a Transonic Spinning Projectile A85-015

***Vibration***

Analytical Model of Pulsing of Solid Propellant Rocket Motors A85-029
Dynamic Response of the LE-5 Rocket Engine Liquid Oxygen Pump A85-028

## Marine Technology

***Hydrodynamics, Vessel and Control Surface***

Frequency Characteristics of a Bubble Cluster in a Vibrated Liquid Column A85-099

## Propulsion

***Combustion and Combustor Designs***

Effects of an S-Inlet on the Flow in a Dump Combustor A85-035

***Combustion Stability, Ignition, and Detonation***

Some New Results of Chuffing in Composite Solid Propellant Rockets A85-033
Analytical Model of Pulsing of Solid Propellant Rocket Motors A85-029

***Electric and Advanced Space Propulsion***

Measurement of Energy Distribution in Flowing Hydrogen Microwave Plasmas A85-096
Analysis of Electromagnetic Propulsion of Nonionized Dipole Gases A85-071
Development of a Large Inert Gas Ion Thruster A85-070
MPD Thruster Performance with Various Propellants A85-063
Minimum Hole Size in Ion Optics A85-056
Starwisp: An Ultra-Light Interstellar Probe A85-051
Example Solar Electric Propulsion System Asteroid Tours Using Variational Calculus A85-048
Experiments in Charge Control at Geosynchronous Orbit - ATS-5 and ATS-6 A85-039
Charging of Large Structures in Space with Application to the Solar Sail Spacecraft A85-038
Inert Gas Test of Two 12-cm Magnetostatic Thrusters A85-022
Ion Accelerator Systems for High-Power 30-cm Thruster Operation A85-012
Experimental Investigation of an Argon Hollow Cathode A85-011

***Engine Performance***

Metal Combustion Efficiency Predictions for Low $L^*$ Rocket Motors A85-076
Criteria for Ignition in Monopropellant Engines A85-032

***Environmental Effects***

The Shuttle Environment: Gases, Particulates, and Glow A85-075
Ignition/Duct Overpressure Induced by Space Shuttle Solid Rocket Motor Ignition A85-073
Bulk Modulus Determination of Solid Propellant Void Content A85-021

***Fuels and Propellants, Properties of***

Deposit Formation and Heat-Transfer Characteristics of Hydrocarbon Rocket Fuels A85-087
Aries Rocket Motor Infrared and Ultraviolet Spent-Stage Emission A85-086
Metal Combustion Efficiency Predictions for Low $L^*$ Rocket Motors A85-076
Prediction of Burning Rates in Nozzleless Rocket Motors A85-059
Bulk Modulus Determination of Solid Propellant Void Content A85-021

***Liquid Rocket Engines and Missile Systems***

Effects of Tripropellant Engines on Earth-to-Orbit Vehicles A85-095
Dynamic Response of the LE-5 Rocket Engine Liquid Oxygen Pump A85-028
Low-Thrust $LO_2/LH_2$ Engine Performance with a 300:1 Nozzle A85-027
Simplified Design and Life Prediction of Rocket Thrust Chambers A85-026

### *Solid and Hybrid Rocket Engines*

Metal Combustion Efficiency Predictions for Low $L^*$ Rocket Motors A85-076
Recession Behavior of Graphitic Nozzles in Simulated Rocket Motors A85-060
Prediction of Burning Rates in Nozzleless Rocket Motors A85-059
Some New Results of Chuffing in Composite Solid Propellant Rockets A85-033

## Spacecraft Technology

### *Configurational and Structural Design (including Loads)*

Close-Pack Modules for Manned Space Structures A85-089
How Beryllium Proved Successful on the Space Shuttle Orbiter A85-085
Effects of Random Member Length Errors on the Accuracy and Internal Loads of Truss Antennas A85-084
Natural Environment Considerations for Space Shuttle System Development Support A85-053
Tension Line Fields in a Simply Supported Blanket Subjected to In-Plane Body Forces A85-019

### *Data Sensing, Presentation, and Transmission*

Optical Effects of Spacecraft-Environment Interaction: Spectrometric Observations of the DE-2 Satellite A85-025

### *Dynamics and Control*

Vibration Characteristics of Hexagonal Radial Rib and Hoop Platforms A85-068
Charging of Large Structures in Space with Application to the Solar Sail Spacecraft A85-038
Impact of Uncommanded Effector Motions on Shuttle Consumables A85-024

### *Earth-Orbital Trajectories*

Magnetospheric Plasma Modeling (0-100 keV) A85-037

### *Electric Power*

Current Collection from the Space Plasma Through Defects in Solar Array Insulation A85-097

### *Entry Vehicle Aerodynamic Heating*

High-Altitude Effects on Three-Dimensional Nonequilibrium Viscous Shock-Layer Flows A85-094
Shock-Interaction-Induced Heat Transfer to the Orbiter Wing Lower Surface A85-078
Effects on Nonequilibrium and Wall Catalysis on Shuttle Heat Transfer A85-074
Experimental Aerodynamic Heating to Simulated Shuttle Tiles A85-064
Engineering Flowfield Method with Angle-of-Attack Applications A85-061
Heating Measurements on Space Shuttle Orbiter Models with Differentially Deflected Elevons A85-017
Computational Chemistry and Aeroassisted Orbital Transfer Vehicles A85-007
Introductory Aerothermodynamics of Advanced Space Transportation Systems A85-002
A Survey of Aeroassisted Orbit Transfer A85-001

### *Entry Vehicle Aerodynamics*

Comparative Analysis of Numerical Schemes for Hypersonic Re-entry Flows A85-082
Shuttle Orbiter High Resolution Accelerometer Package Experiment: Preliminary Flight Results A85-072
Nature and Reduction of Errors in Near-Earth Autonomous Satellite Navigation A85-062
Aerodynamics of Generalized Bent Biconics for Aero-Assisted, Orbital-Transfer Vehicles A85-014
A Survey of Aeroassisted Orbit Transfer A85-001

### *Entry Vehicle Configuration Design*

Comparative Analysis of Numerical Schemes for Hypersonic Re-entry Flows A85-082
Aerodynamics of Generalized Bent Biconics for Aero-Assisted, Orbital-Transfer Vehicles A85-014
Aerothermodynamic Design Feasibility of a Mars Aerocapture Vehicle A85-009
A Survey of Aeroassisted Orbit Transfer A85-001

### *Entry Vehicle Dynamics and Control*

Aerodynamic Control of the Space Shuttle Orbiter with Tip-Fin Controllers A85-081

### *Entry Vehicle Mission Studies and Flight Mechanics*

Aerodynamic Control of the Space Shuttle Orbiter with Tip-Fin Controllers A85-081
Optical Effects of Spacecraft-Environment Interaction: Spectrometric Observations of the DE-2 Satellite A85-025
Analytic Solution for a Cruising Plane Change Maneuver A85-018

### *Entry Vehicle Structural Design*

Verification Tests of Durable Thermal Protection System Concepts A85-092
Long-Term, Light-Induced Changes in the Dark Conductivity of Kapton A85-054

### *Entry Vehicle Subsystems*

Estimate of the Probability of a Lightning Strike to the Galileo Probe A85-034
Impact of Uncommanded Effector Motions on Shuttle Consumables A85-024

### *Entry Vehicles and Landers*

Estimate of the Probability of a Lightning Strike to the Galileo Probe A85-034
Aerothermodynamic Design Feasibility of a Mars Aerocapture Vehicle A85-009

### *Extra-Vehicular Activity*

Path-Constrained Maneuvering Near Large Space Structures A85-083

### *Lunar and Interplanetary Trajectories*

Starwisp: An Ultra-Light Interstellar Probe A85-051
Interplanetary Missions for the Late Twentieth Century A85-047

### *Meteoroid and Radiation Protection*

Studies of Microdamage in Dielectric Discharges A85-041
Spacecraft Discharge Electromagnetic Interference Coupling Models A85-040

### *Mission Analysis*

Path-Constrained Maneuvering Near Large Space Structures A85-083
Natural Environment Considerations for Space Shuttle System Development Support A85-053
Example Solar Electric Propulsion System Asteroid Tours Using Variational Calculus A85-048
Interplanetary Missions for the Late Twentieth Century A85-047
Magnetospheric Plasma Modeling (0-100 keV) A85-037
Impact of Uncommanded Effector Motions on Shuttle Consumables A85-024

### *Missions and Economics*

Payload Piggybacking Aboard Shuttle Solid Rocket Booster A85-104
Benefits of a Reusable Upper Stage Orbital Maneuvering Vehicle A85-052

### *Navigation, Guidance, and Flight-Path Control*

Nature and Reduction of Errors in Near-Earth Autonomous Satellite Navigation A85-062
Analytic Solution for a Cruising Plane Change Maneuver A85-018

### *Propulsion Systems Integration*

Supersonic Wind Tunnel Simulation of Propulsive Jets A85-080

### *Signatures and Tracking*

Mitigation of Scattered Solar Radiation from Condensed Attitude Control Jet Plumes A85-031

### *Simulation*

Magnetospheric Plasma Modeling (0-100 keV) A85-037

### *Space Station Systems, Manned*

Close-Pack Modules for Manned Space Structures A85-089
Benefits of a Reusable Upper Stage Orbital Maneuvering Vehicle A85-052

### *Temperature Control*

Transient Temperature Distributions in a Radiantly Heated Hollow Cylinder A85-103
Verification Tests of Durable Thermal Protection System Concepts A85-092
Improved Double-Wall Artery High-Capacity Heat Pipe A85-091
Review of the In-Orbit Thermal Performance of the Maritime Communication Statellite MCS-A A85-069
Thermal Control System of the Purdue University Space Shuttle Payload A85-057
System Test and Flight Results from Infrared Astronomical Satellite External Thermal Subsystem A85-023

### *Testing, Flight and Ground*

Improved Double-Wall Artery High-Capacity Heat Pipe A85-091
System Test and Flight Results from Infrared Astronomical Satellite External Thermal Subsystem A85-023

## Structural Mechanics and Materials

### *Aeroelasticity and Hydroelasticity*

Aeroelastic Characteristics of the Space Shuttle External Tank Cable Trays A85-043

### *Materials, Properties of*

How Beryllium Proved Successful on the Space Shuttle Orbiter A85-085
Long-Term, Light-Induced Changes in the Dark Conductivity of Kapton A85-054
Studies of Microdamage in Dielectric Discharges A85-041
Bulk Modulus Determination of Solid Propellant Void Content A85-021

### *Structural Composite Materials*

Close-Pack Modules for Manned Space Structures A85-089

### *Structural Design*

How Beryllium Proved Successful on the Space Shuttle Orbiter A85-085
Effects of Random Member Length Errors on the Accuracy and Internal Loads of Truss Antennas A85-084
Vibration Characteristics of Hexagonal Radial Rib and Hoop Platforms A85-068
Structural Concepts for Future Space Transportation System Orbiters A85-049
Tension Line Fields in a Simply Supported Blanket Subjected to In-Plane Body Forces A85-019
Precision of Mesh-Type Reflectors for Large Space-Borne Antennas A85-010

### *Structural Durability (including Fatigue and Fracture)*

Structural Response and Acoustic Fatigue for Random Progressive Waves and Diffuse Fields A85-050
Simplified Design and Life Prediction of Rocket Thrust Chambers A85-026
Environmental Effects on Cumulative Damage in Rocket Motors A85-020

### *Structural Dynamics*

Vibration Characteristics of Hexagonal Radial Rib and Hoop Platforms A85-068
Time-Domain Response Envelope for Structural Dynamic Systems A85-067
Structural Response and Acoustic Fatigue for Random Progressive Waves and Diffuse Fields A85-050

### *Structural Statics*

Effects of Random Member Length Errors on the Accuracy and Internal Loads of Truss Antennas A85-084
Tension Line Fields in a Simply Supported Blanket Subjected to In-Plane Body Forces A85-019
Precision of Mesh-Type Reflectors for Large Space-Borne Antennas A85-010

### *Thermal Stresses*

Thermal-Structural Analysis of Large Space Structures: An Assessment of Recent Advances A85-058

## Thermophysics and Thermochemistry

### *Ablation, Pyrolysis, Thermal Decomposition and Degradation (including Refractories)*

Review of the In-Orbit Thermal Performance of the Maritime Communication Statellite MCS-A A85-069

### *Experimental Methods of Diagnostics*

Measurement of Energy Distribution in Flowing Hydrogen Microwave Plasmas A85-096

### *Heat Conduction*

Effect of Contact Spacing on Efficiency of Flat-Plate Solar Collectors A85-090
A Nine-Noded Quadratic Control-Volume-Based Finite Element for Heat Conduction A85-079
Long-Term, Light-Induced Changes in the Dark Conductivity of Kapton A85-054
Environmental Effects on Cumulative Damage in Rocket Motors A85-020

### *Heat Pipes*

Improved Double-Wall Artery High-Capacity Heat Pipe A85-091

### *Radiation and Radiative Heat Transfer*

Transient Temperature Distributions in a Radiantly Heated Hollow Cylinder A85-103
Radiation Energy Receiver for Solar Propulsion Systems A85-098
Optical Effects of Spacecraft-Environment Interaction: Spectrometric Observations of the DE-2 Satellite A85-025
Environmental Effects on Cumulative Damage in Rocket Motors A85-020
Computational Chemistry and Aeroassisted Orbital Transfer Vehicles A85-007
Trajectory Analysis of Radiative Heating for Planetary Missions with Aerobraking of Spacecraft A85-004

### *Radiatively Coupled Flows and Heat Transfer*

Radiation Enhancement by Nonequilibrium in Earth's Atmosphere A85-003
Introductory Aerothermodynamics of Advanced Space Transportation Systems A85-002

### *Thermal Control*

Verification Tests of Durable Thermal Protection System Concepts A85-092
Thermal Control System of the Purdue University Space Shuttle Payload A85-057
System Test and Flight Results from Infrared Astronomical Satellite External Thermal Subsystem A85-023

### *Thermal Modeling and Analysis*

Transient Temperature Distributions in a Radiantly Heated Hollow Cylinder A85-103
Effect of Contact Spacing on Efficiency of Flat-Plate Solar Collectors A85-090
A Nine-Noded Quadratic Control-Volume-Based Finite Element for Heat Conduction A85-079
Review of the In-Orbit Thermal Performance of the Maritime Communication Statellite MCS-A A85-069
Thermal-Structural Analysis of Large Space Structures: An Assessment of Recent Advances A85-058
Thermal Control System of the Purdue University Space Shuttle Payload A85-057
Aerothermodynamic Design of High Speed Rockets A85-046

### *Thermochemistry and Chemical Kinetics*

The Shuttle Environment: Gases, Particulates, and Glow A85-075
Computational Chemistry and Aeroassisted Orbital Transfer Vehicles A85-007
Radiation Enhancement by Nonequilibrium in Earth's Atmosphere A85-003
Introductory Aerothermodynamics of Advanced Space Transportation Systems A85-002

# Author Index


Abreu, V. J., A85-025
Agrell, J., A85-080
Altman, G. G., A85-024
Andiroglu, E., A85-060
Arnold, J. O., A85-007
Aston, G., A85-012
August, H., A85-093
Avery, D. E., A85-064
Badlani, M. L., A85-026
Balakrishnan, A., A85-005
Beam, J. E., A85-091
Beckwith, S. W., A85-021
Beddini, R. A., A85-055
Belvin, W. K., A85-068
Bennett, M. D., A85-101
Benziger, J. B., A85-032
Bhaskariah, P., A85-033
Bhutta, B. A., A85-082
Blanchard, R. C., A85-072
Blume, W. H., A85-047
Borucki, W. J., A85-034
Brown, S. C., A85-053
Burrows, R. R., A85-048
Bushnell, D., A85-066
Caledonia, G. E., A85-075
Campbell, J. D., A85-060
Carroll, H. B., A85-021
Cerro, J. A., A85-049
Cervisi, R. T., A85-018
Chalmers, D. R., A85-069
Chapman, R., A85-096
Chen, J., A85-067
Clever, R. M., A85-030
Cooper, D. M., A85-007
Crha, S., A85-090
Cummings, R. M., A85-093
Cupp, R. K., A85-011
Dash, S. M., A85-055
Davies, C. B., A85-014
Davis, R. B., A85-065
Davis, R. C., A85-049
Davy, W. C., A85-005
DeVilbiss, C. E., A85-029
Edwards, D. K., A85-103
Ericsson, L. E., A85-043
Evanbar, M. S., A85-024
Finzel, M., A85-096
Fiscina, C., A85-008
Florence, D. E., A85-009
Forward, R. L., A85-051
Fowler, W. T., A85-083
Frankel, D. S., A85-086
Freeman, D. C., Jr., A85-081
Frisina, W., A85-089
Gans, R. F., A85-042
Garba, J. A., A85-067
Garrett, H. B., A85-037
Gersh, M. E., A85-086
Giovanetti, A. J., A85-087
Gorney, D. J., A85-077
Green, B. D., A85-075
Greene, W. H., A85-084
Guruswamy, J., A85-035
Hackett, R. M., A85-029
Hansen, S. G., A85-093
Hartung, L. C., A85-078
Hashimoto, H. T. U., A85-099
Hassani, V., A85-079
Hawley, M. C., A85-096
Hays, P. B., A85-025
Hazelton, R. C., A85-041
Heller, R. A., A85-020
Hemsch, M. J., A85-045
Hill, J. R., A85-038
Hirakoso, H., A85-027
Horwitz, J. L., A85-036
Howe, J. T., A85-002
Huffman, R. E., A85-031, A85-086
Hulkower, N. D., A85-047
Ikawa, H., A85-073
Jackson, L. R., A85-049
Jaffe, R. L., A85-007
Jenkins, R. E., A85-062
Jones, J. J., A85-006
Kamijo, K., A85-028
Kasper, H. J., A85-026
Kasraie, B., A85-026
Kaufman, H. R., A85-011, A85-056, A85-097
Kautz, F. A., II, A85-082
Kerr, P. A., A85-064
Keswani, S. T., A85-060
Kim, M. D., A85-013
King, M. K., A85-059, A85-076
Kingsland, B., A85-019
Kolasinski, W. A., A85-077
Kolb, C. E., A85-031
Kroncke, G. T., A85-052
Kuo, K. K., A85-060
Kuriki, K., A85-063
Laspesa, F. S., A85-073
LeMessurier, R. W., A85-065
Leung, M. S., A85-054
Lewis, C. H., A85-013, A85-082, A85-094
Lindemann, A. M., A85-088
Lombard, C. K., A85-005
Lucero, E. F., A85-016
Lyons, R. B., A85-031
MacConochie, I. O., A85-065
Mahefkey, T., A85-091
Marchman, J. F., III, A85-035
Martin, J. A., A85-095
Maydew, R. C., A85-046
McAlees, S., Jr., A85-046
McIntyre, A., A85-031, A85-086
Menees, G. P., A85-004
Meyer, R. X., A85-010
Micci, M. M., A85-071
Miller, M. C., A85-015
Miyajima, H., A85-027
Mizera, P. F., A85-054, A85-077
Morimoto, S., A85-063
Morin, T., A85-096
Morrison, A. M., A85-008
Nakahashi, K., A85-027
Nielsen, J. N., A85-045
Norwood, L. B., A85-085
Nyberg, S.-E., A85-080
O'Donnell, W. J., A85-026
Olsen, R. C., A85-039
Park, C., A85-003, A85-014
Paul, D. B., A85-058
Paulsen, D. E., A85-031, A85-086
Pepper, W. B., A85-100
Pergament, H. S., A85-055
Petrick, S. W., A85-023
Pisacane, V. L., A85-062
Pittman, C. M., A85-092
Ponnappan, R., A85-091
Porowski, J. S., A85-026
Powell, R. W., A85-081
Raghunandan, B.N., A85-033
Ramsey, W. D., A85-022
Rault, D. F. G., A85-098
Raw, M. J., A85-079
Reding, J. P., A85-043
Rimrott, F., A85-019
Robinson, R. S., A85-011, A85-056, A85-097
Roeder, J. L., A85-077
Rutherford, J. F., A85-072
Sakurai, Y., A85-103
Salazar, R. P., A85-023
Savu, G., A85-102
Schetz, J. A., A85-035
Schneider, G. E., A85-079, A85-090
Scott, C. D., A85-074
Scotti, S. J., A85-049
Serbanescu, E., A85-102
Shideler, J. L., A85-092
Shimura, T., A85-028
Shinn, J. L., A85-006
Simkin, D. J., A85-024
Simmonds, A. L., A85-061
Singh, M. P., A85-020
Skinner, W. R., A85-025
Sogame, E., A85-027
Song, D. J., A85-094
Spadaccini, L. J., A85-087
Spitale, G. C., A85-037
Stark, J. A., A85-057
Steiner, G., A85-070
Stern, S. A., A85-083, A85-104
Stillwell, R. P., A85-011, A85-097
Strong, J. E., A85-032
Sudo, S., A85-099
Sun, J., A85-093
Swaminathan, S., A85-094
Szetela, E. J., A85-087
Tallentire, F. I., A85-104
Taylor, A. H., A85-049
Thornton, E. A., A85-058
Throckmorton, D. A., A85-078
Trubert, M., A85-067
Tueling, M. B., A85-054
Uematsu, K., A85-063
Vaughan, W. W., A85-053
Walberg, G. D., A85-001
Wallace, C. E., A85-050
Wallace, R. A., A85-047
Wassel, A. T., A85-030
Webb, G. L., A85-092
Weilmuenster, K. J., A85-044
Wells, W. L., A85-017
Wen, L., A85-023
Wenaas, E. P., A85-040
Whipple, E. C., Jr., A85-038
White, R. A., A85-080
Wieting, A. R., A85-064
Wilkerson, T. D., A85-075
Wolf, D. E., A85-055
Woods, A. J., A85-040
Wyatt, F. V., A85-101
Yadlowsky, E. J., A85-041
Yee, J., A85-025
Yen, C. L., A85-047
Yionoulis, S. M., A85-062
Zibdeh, H., A85-020
Zoby, E. V., A85-061

# Chronological Index

**A85-001 A Survey of Aeroassisted Orbit Transfer.** Gerald D. Walberg, *NASA Langley Research Center* (**22**, 1, p. 3) Article based on AIAA Paper 82-1378

**A85-002 Introductory Aerothermodynamics of Advanced Space Transportation Systems.** John T. Howe, *NASA Ames Research Center* (**22**, 1, p. 19) Article based on AIAA Paper 83-0406

**A85-003 Radiation Enhancement by Nonequilibrium in Earth's Atmosphere.** Chul Park (**22**, 1, p. 27) Article based on AIAA Paper 83-0410

**A85-004 Trajectory Analysis of Radiative Heating for Planetary Missions with Aerobraking of Spacecraft.** Gene P. Menees, *NASA Ames Research Center* (**22**, 1, p. 37) Article based on AIAA Paper 83-0407

**A85-005 Real-Gas Flowfields about Three-Dimensional Configurations.** A. Balakrishnan, *PEDA Corporation*; W. C. Davy, *NASA Ames Research Center*; and C. K. Lombard, *PEDA Corporation* (**22**, 1, p. 46) Article based on AIAA Paper 83-0581

**A85-006 Chemical Nonequilibrium Effects on Flowfields for Aeroassisted Orbital Transfer Vehicles.** Judy L. Shinn and Jim J. Jones, *NASA Langley Research Center* (**22**, 1, p. 54) Article based on AIAA Paper 83-0214

**A85-007 Computational Chemistry and Aeroassisted Orbital Transfer Vehicles.** D. M. Cooper, R. L. Jaffe and J. O. Arnold, *NASA Ames Research Center* (**22**, 1, p. 60) Article

**A85-008 Effects of Spin and Mass Addition on High-Angle-of-Attack Re-entry.** A. M. Morrison and C. Fiscina, *Naval Surface Weapons Center* (**22**, 1, p. 68) Article based on AIAA Paper 82-0190

**A85-009 Aerothermodynamic Design Feasibility of a Mars Aerocapture Vehicle.** Dwight E. Florence, *General Electric Company* (**22**, 1, p. 74) Article based on AIAA Paper 81-0350

**A85-010 Precision of Mesh-Type Reflectors for Large Space-Borne Antennas.** Rudolf X. Meyer, *The Aerospace Corporation* (**22**, 1, p. 80) Article based on AIAA Paper 82-0652

**A85-011 Experimental Investigation of an Argon Hollow Cathode.** R. P. Stillwell, *The BDM Corporation*; R. S. Robinson, H. R. Kaufman and R. K. Cupp, *Colorado State University* (**22**, 1, p. 85) Article based on AIAA Paper 82-1890 CP827

**A85-012 Ion Accelerator Systems for High-Power 30-cm Thruster Operation.** Graeme Aston, *Jet Propulsion Laboratory, California Institute of Technology* (**22**, 1, p. 91) Article based on AIAA Paper 82-1893

**A85-013 Three-Dimensional Nonequilibrium Viscous Flow over the Shuttle Orbiter with Catalytic Surface Effects.** M. D. Kim and Clark H. Lewis, *Virginia Polytechnic Institute and State University* (**22**, 2, p. 97) Article based on AIAA Paper 83-1426

**A85-014 Aerodynamics of Generalized Bent Biconics for Aero-Assisted, Orbital-Transfer Vehicles.** Carol B. Davies, *Informatics General Corporation*; and Chul Park, *NASA Ames Research Center* (**22**, 2, p. 104) Article based on AIAA Paper 83-1512

**A85-015 Surface Pressure Measurements on a Transonic Spinning Projectile.** M. C. Miller, *USAAMCC, Aberdeen Proving Ground* (**22**, 2, p. 112) Article based on AIAA Paper 83-1838

**A85-016 Predicting the Supersonic Aerodynamics of Very-Low-Aspect-Ratio Lifting Surfaces.** Eddie F. Lucero, *The Johns Hopkins University* (**22**, 2, p. 119) Article based on AIAA Paper 84-0575

**A85-017 Heating Measurements on Space Shuttle Orbiter Models with Differentially Deflected Elevons.** William L. Wells, *NASA Langley Research Center* (**22**, 2, p. 126) Article based on AIAA Paper 83-1534

**A85-018 Analytic Solution for a Cruising Plane Change Maneuver.** Richard T. Cervisi, *Rockwell International* (**22**, 2, p. 134) Article based on AIAA Paper 83-2095

**A85-019 Tension Line Fields in a Simply Supported Blanket Subjected to In-Plane Body Forces.** Fred Rimrott and Blair Kingsland, *University of Toronto* (**22**, 2, p. 141) Article

**A85-020 Environmental Effects on Cumulative Damage in Rocket Motors.** R. A. Heller, M. P. Singh and H. Zibdeh, *Virginia Polytechnic Institute and State University* (**22**, 2, p. 149) Article based on AIAA Paper 83-1120

**A85-021 Bulk Modulus Determination of Solid Propellant Void Content.** S. W. Beckwith and H. B. Carroll, *Hercules Aerospace Division* (**22**, 2, p. 156) Article based on AIAA Paper 83-1119

**A85-022 Inert Gas Test of Two 12-cm Magnetostatic Thrusters.** William D. Ramsey, *Loral Electro-Optical Systems* (**22**, 2, p. 162) Article based on AIAA Paper 82-1925

**A85-023 System Test and Flight Results from Infrared Astronomical Satellite External Thermal Subsystem.** Ronald P. Salazar, S. Walter Petrick and Liang-Chi Wen, *Jet Propulsion Laboratory, California Institute of Technology* (**22**, 2, p. 166) Article

**A85-024 Impact of Uncommanded Effector Motions on Shuttle Consumables.** M. S. Evanbar, D. J. Simkin and G. G. Altman, *Rockwell International* (**22**, 2, p. 170) Article based on AIAA Paper 82-1605 CP826

**A85-025 Optical Effects of Spacecraft-Environment Interaction: Spectrometric Observations of the DE-2 Satellite.** Vincent J. Abreu, Wilbert R. Skinner and Paul B. Hays, *University of Michigan*; and Jen-Hwa Yee, *Harvard-Smithsonian Center for Astrophysics* (**22**, 2, p. 177) Article based on AIAA Paper 83-2657

**A85-026 Simplified Design and Life Prediction of Rocket Thrust Chambers.** J. S. Porowski, W. J. O'Donnell, M. L. Badlani and B. Kasraie, *O'Donnell & Associates, Inc.*; and H. J. Kasper, *NASA Lewis Research Center* (**22**, 2, p. 181) Article based on AIAA Paper 82-1251

**A85-027 Low-Thrust $LO_2/LH_2$ Engine Performance with a 300:1 Nozzle.** H. Miyajima and K. Nakahashi, *National Aerospace Laboratory (Japan)*; H. Hirakoso, *Mitsubishi Heavy Industries, Ltd. (Japan)*; and E. Sogame, *National Space Development Agency of Japan* (**22**, 2, p. 188) Article based on AIAA Paper 83-1313

**A85-028 Dynamic Response of the LE-5 Rocket Engine Liquid Oxygen Pump.** T. Shimura, *Natioanl Aerospace Laboratory of*

*Japan*; and K. Kamijo, *National Aerospace Laboratory of Japan* (**22**, 2, p. 195) Article based on AIAA Paper 83-1385

**A85-029 Analytical Model of Pulsing of Solid Propellant Rocket Motors.** R. M. Hackett, *The University of Alabama in Huntsville*; and C. E. DeVilbiss, *John W. McDougall Company, Inc.* (**22**, 2, p. 201) Article

**A85-030 Three-Dimensional Transient Heat Conducton in a Multilayer Medium.** R. M. Clever, *TRW Systems*; and A. T. Wassel, *Science Applications, Inc.* (**22**, 2, p. 211) Engineering Note

**A85-031 Mitigation of Scattered Solar Radiation from Condensed Attitude Control Jet Plumes.** C. E. Kolb and R. B. Lyons, *Aerodyne Research, Inc.*; R. E. Huffman, D. E. Paulsen and A. McIntyre, *Air Force Geophysics Laboratory, Hanscom Air Force Base* (**22**, 2, p. 215) Engineering Note

**A85-032 Criteria for Ignition in Monopropellant Engines.** Jay B. Benziger and John E. Strong, *Princeton University* (**22**, 2, p. 217) Engineering Note

**A85-033 Some New Results of Chuffing in Composite Solid Propellant Rockets.** B.N. Raghunandan and P. Bhaskariah, *Indian Institute of Science* (**22**, 2, p. 218) Engineering Note

**A85-034 Estimate of the Probability of a Lightning Strike to the Galileo Probe.** W. J. Borucki, *NASA Ames Research Center* (**22**, 2, p. 220) Engineering Note

**A85-035 Effects of an S-Inlet on the Flow in a Dump Combustor.** J. A. Schetz, *Virginia Polytechnic Institute and State University*; J. Guruswamy, *Virginai Polytechnic Institute and State University*; and J. F. Marchman III, *Virginia Polytechnic Institute and State University* (**22**, 2, p. 221) Engineering Note

**A85-036 Dynamics of Magnetospheric Plasmas.** J. L. Horwitz, *The University of Alabama* (**22**, 3, p. 225) Article

**A85-037 Magnetospheric Plasma Modeling (0-100 keV).** Henry Berry Garrett and Guy C. Spitale, *Jet Propulsion Laboratory, California Institute of Technology* (**22**, 3, p. 231) Survey Paper

**A85-038 Charging of Large Structures in Space with Application to the Solar Sail Spacecraft.** Jay R. Hill and Elden C. Whipple Jr., *University of California at San Diego* (**22**, 3, p. 245) Survey Paper

**A85-039 Experiments in Charge Control at Geosynchronous Orbit - ATS-5 and ATS-6.** R. C. Olsen, *The University of Alabama* (**22**, 3, p. 254) Survey Paper

**A85-040 Spacecraft Discharge Electromagnetic Interference Coupling Models.** A. J. Woods and E. P. Wenaas, *JAYCOR* (**22**, 3, p. 265) Survey Paper

**A85-041 Studies of Microdamage in Dielectric Discharges.** E. J. Yadlowsky and R. C. Hazelton, *HY-Tech Research Corporation* (**22**, 3, p. 282) Article

**A85-042 Liquid Management in Low Gravity Using Baffled Rotating Containers.** Roger F. Gans, *University of Rochester* (**22**, 3, p. 287) Synoptic

**A85-043 Aeroelastic Characteristics of the Space Shuttle External Tank Cable Trays.** L. E. Ericsson and J. P. Reding, *Lockheed Missiles & Space Company* (**22**, 3, p. 289) Article based on AIAA Paper 82-0633 CP823

**A85-044 Comparison of Inviscid Flow Computations with Flight Data for the Shuttle Orbiter.** K. James Weilmuenster, *NASA Langley Research Center* (**22**, 3, p. 297) Article based on AIAA Paper 83-1798

**A85-045 Extension of Equivalent Angle-of-Attack Method for Nonlinear Flowfields.** M. J. Hemsch, *Nielsen Engineering & Research, Inc.*; and J. N. Nielsen, *Nielsen Engineering & Research, inc.* (**22**, 3, p. 304) Article based on AIAA Paper 83-2083

**A85-046 Aerothermodynamic Design of High Speed Rockets.** Samuel McAlees Jr. and Randall C. Maydew, *Sandia National Laboratories* (**22**, 3, p. 309) Article

**A85-047 Interplanetary Missions for the Late Twentieth Century.** R. A. Wallace, W. H. Blume, N. D. Hulkower and C. L. Yen, *Jet Propulsion Laboratory, California Institute of Technology* (**22**, 3, p. 316) Article based on AIAA Paper 82-1463

**A85-048 Example Solar Electric Propulsion System Asteroid Tours Using Variational Calculus.** Roger R. Burrows, *NASA Marshall Space Flight Center* (**22**, 3, p. 325) Article

**A85-049 Structural Concepts for Future Space Transportation System Orbiters.** Allan H. Taylor, L. Robert Jackson and Randall C. Davis, *NASA Langley Research Center*; Jeffrey A. Cerro and Stephen J. Scotti, *Kentron International Inc.* (**22**, 3, p. 333) Article based on AIAA Paper 83-0210

**A85-050 Structural Response and Acoustic Fatigue for Random Progressive Waves and Diffuse Fields.** C. E. Wallace, *Arizona State University* (**22**, 3, p. 340) Article

**A85-051 Starwisp: An Ultra-Light Interstellar Probe.** Robert L. Forward, *Hughes Research Laboratories* (**22**, 3, p. 345) Article

**A85-052 Benefits of a Reusable Upper Stage Orbital Maneuvering Vehicle.** G. Thomas Kroncke, *Martin Marietta Aerospace* (**22**, 3, p. 351) Article based on AIAA Paper 83-1304

**A85-053 Natural Environment Considerations for Space Shuttle System Development Support.** William W. Vaughan and S. Clark Brown, *NASA Marshall Space Flight Center* (**22**, 3, p. 355) Article based on AIAA Paper 83-2663

**A85-054 Long-Term, Light-Induced Changes in the Dark Conductivity of Kapton.** M. S. Leung, M. B. Tueling and P. F. Mizera, *The Aerospace Corporation* (**22**, 3, p. 361) Article

**A85-055 Analysis of Two-Phase Flow Processes in Rocket Exhaust Plumes.** S. M. Dash, D. E. Wolf and R. A. Beddini, *Science Applications, Inc.*; and H. S. Pergament, *Science Applicaitons, Inc.* (**22**, 3, p. 367) Article based on AIAA Paper 83-0248

**A85-056 Minimum Hole Size in Ion Optics.** Harold R. Kaufman and Raymond S. Robinson, *Colorado State University* (**22**, 3, p. 381) Engineering Note

**A85-057 Thermal Control System of the Purdue University Space Shuttle Payload.** John Aldrich Stark, *Purdue University* (**22**, 3, p. 382) Engineering Note

**A85-058 Thermal-Structural Analysis of Large Space Structures: An Assessment of Recent Advances.** Earl A. Thornton, *Old Dominion University*; and Donald B. Paul, *Wright-Patterson Air Force Base* (**22**, 4, p. 385) Survey Paper based on AIAA Paper 83-1018 CP833

**A85-059 Prediction of Burning Rates in Nozzleless Rocket Motors.** Merrill K. King, *Atlantic Research Corporation* (**22**, 4, p. 394) Synoptic based on AIAA Paper 82-1200

**A85-060 Recession Behavior of Graphitic Nozzles in Simulated Rocket Motors.** S. T. Keswani, E. Andiroglu, J. D. Campbell and K. K. Kuo, *The Pennsylvania State University* (**22**, 4, p. 396) Synoptic based on AIAA Paper 83-1317

**A85-061 Engineering Flowfield Method with Angle-of-Attack Applications.** E. V. Zoby and A. L. Simmonds, *NASA Langley Research Center* (**22**, 4, p. 398) Article based on AIAA Paper 84-0303

**A85-062 Nature and Reduction of Errors in Near-Earth Autonomous Satellite Navigation.** Vincent L. Pisacane, Steve M. Yionoulis and Robert E. Jenkins, *The John Hopkins University* (**22**, 4, p. 405) Article

**A85-063 MPD Thruster Performance with Various Propellants.** K. Uematsu and S. Morimoto, *Ishikawajima-Harima Heavy Industries Company, Ltd.*; and K. Kuriki, *Institute of Space and Astronautical Science (Japan)* (**22**, 4, p. 412) Article based on AIAA Paper 82-1885

**A85-064 Experimental Aerodynamic Heating to Simulated Shuttle Tiles.** Don E. Avery, Patricia A. Kerr and Allan R. Wieting, *NASA Langley Research Center* (**22**, 4, p. 417) Article based on AIAA Paper 83-1536

**A85-065 Alternative Designs of Integral Tanks for Advanced Space Transportation Systems.** Ian O. MacConochie and R. B. Davis, *NASA Langley Research Center*; and R. W. LeMessurier, *Kentron International, Inc.* (**22**, 4, p. 425) Article based on AIAA Paper 82-0634 CP824

**A85-066 Optimum Design of Dewar Supports.** David Bushnell, *Lockheed Applied Mechanics* (**22**, 4, p. 432) Article based on AIAA Paper 83-0829 CP831

**A85-067 Time-Domain Response Envelope for Structural Dynamic Systems.** Jay-Chung Chen, Marc Trubert and John A. Garba, *Jet Propulsion Laboratory, California Institute of Technology* (**22**, 4, p. 442) Article based on AIAA Paper 83-0818 CP832

**A85-068 Vibration Characteristics of Hexagonal Radial Rib and Hoop Platforms.** W. Keith Belvin, *NASA Langley Research Center* (**22**, 4, p. 450) Article based on AIAA Paper 83-0822 CP831

**A85-069 Review of the In-Orbit Thermal Performance of the Maritime Communication Statellite MCS-A.** D. R. Chalmers, *ERNO Raumfahrttechnik GmbH* (**22**, 4, p. 457) Article based on AIAA Paper 83-1494

**A85-070 Development of a Large Inert Gas Ion Thruster.** G. Steiner, *Xerox Electro-Optical Systems* (**22**, 4, p. 465) Article based on AIAA Paper 82-1927

**A85-071 Analysis of Electromagnetic Propulsion of Nonionized Dipole Gases.** Michael M. Micci, *The Pennsylvania State University* (**22**, 4, p. 469) Article based on AIAA Paper 83-1395

**A85-072 Shuttle Orbiter High Resolution Accelerometer Package Experiment: Preliminary Flight Results.** R. C. Blanchard, *NASA Langley Research Center*; and J. F. Rutherford, *NASA Johnson Space Center* (**22**, 4, p. 474) Article based on AIAA Paper 84-0490

**A85-073 Ignition/Duct Overpressure Induced by Space Shuttle Solid Rocket Motor Ignition.** Hideo Ikawa and Fred S. Laspesa, *Rockwell International* (**22**, 4, p. 481) Article based on AIAA Paper 83-1113

**A85-074 Effects on Nonequilibrium and Wall Catalysis on Shuttle Heat Transfer.** C. D. Scott, *NASA Johnson Space Center* (**22**, 5, p. 489) Survey Paper based on AIAA Paper 83-1485

**A85-075 The Shuttle Environment: Gases, Particulates, and Glow.** Byron David Green and George E. Caledonia, *Physical Sciences Inc.*; and Thomas D. Wilkerson, *University of Maryland* (**22**, 5, p. 500) Survey Paper

**A85-076 Metal Combustion Efficiency Predictions for Low $L^*$ Rocket Motors.** Merrill K. King, *Atlantic Research Corporation* (**22**, 5, p. 512) Synoptic based on AIAA Paper 82-1202

**A85-077 An Auroral X-Ray Imaging Spectrometer.** P. F. Mizera, W. A. Kolasinski, D. J. Gorney and J. L. Roeder, *The Aerospace Corporation* (**22**, 5, p. 514) Synoptic

**A85-078 Shock-Interaction-Induced Heat Transfer to the Orbiter Wing Lower Surface.** David A. Throckmorton and Lin C. Hartung, *NASA Langley Research Center* (**22**, 5, p. 516) Article based on AIAA Paper 84-0227

**A85-079 A Nine-Noded Quadratic Control-Volume-Based Finite Element for Heat Conduction.** M. J. Raw, G. E. Schneider and V. Hassani, *University of Waterloo (Canada)* (**22**, 5, p. 523) Article based on AIAA Paper 84-0493

**A85-080 Supersonic Wind Tunnel Simulation of Propulsive Jets.** R. A. White, *University of Illinois at Urbana-Champaign*; J. Agrell and S.-E. Nyberg, *Aeronautical Research Institute of Sweden* (**22**, 5, p. 530) Article based on AIAA Paper 84-0230

**A85-081 Aerodynamic Control of the Space Shuttle Orbiter with Tip-Fin Controllers.** Richard W. Powell and Delma C. Freeman Jr., *NASA Langley Research Center* (**22**, 5, p. 536) Article based on AIAA Paper 84-0488

**A85-082 Comparative Analysis of Numerical Schemes for Hypersonic Re-entry Flows.** Bilal A. Bhutta and Clark H. Lewis, *Virginia Polytechnic Institute and State University*; and Frederick A. Kautz II, *Central Intelligence Agency* (**22**, 5, p. 541) Article based on AIAA Paper 83-1799

**A85-083 Path-Constrained Maneuvering Near Large Space Structures.** S. A. Stern, *University of Colorado*; and W. T. Fowler, *University of Texas, Austin* (**22**, 5, p. 548) Article

**A85-084 Effects of Random Member Length Errors on the Accuracy and Internal Loads of Truss Antennas.** William H. Greene, *NASA Langley Research Center* (**22**, 5, p. 554) Article based on AIAA Paper 83-1019 CP831

**A85-085 How Beryllium Proved Successful on the Space Shuttle Orbiter.** L. B. Norwood, *Rockwell International* (**22**, 5, p. 560)

**A85-086 Aries Rocket Motor Infrared and Ultraviolet Spent-Stage Emission.** D. S. Frankel and M. E. Gersh, *Aerodyne Research, Inc.*; A. McIntyre, R. E. Huffman and D. E. Paulsen, *Air Force Geophysics Laboratory, Hanscom AFB* (**22**, 5, p. 567) Article

**A85-087 Deposit Formation and Heat-Transfer Characteristics of Hydrocarbon Rocket Fuels.** Anthony J. Giovanetti, Louis J. Spadaccini and Eugene J. Szetela, *United Technologies*

*Research Center* (22, 5, p. 574) Article based on AIAA Paper 84-0512

**A85-088 Turbulent Reynolds Analogy Factors for Nonplanar Surface Microgeometries.** A. Margrethe Lindemann, *NASA Langley Research Center* (22, 5, p. 581) Engineering Note

**A85-089 Close-Pack Modules for Manned Space Structures.** Warren Frisina, *Smithtown, New York* (22, 5, p. 583) Engineering Note

**A85-090 Effect of Contact Spacing on Efficiency of Flat-Plate Solar Collectors.** S. Crha and G. E. Schneider, *University of Waterloo* (22, 6, p. 585) Article based on AIAA Paper 84-0146

**A85-091 Improved Double-Wall Artery High-Capacity Heat Pipe.** R. Ponnappan, *Universal Energy Systems, Inc.*; Jerry E. Beam and Tom Mahefkey, *Air Force Wright Aeronautical Laboratories, Wright-Patterson Air Force Base* (22, 6, p. 592) Article based on AIAA Paper 84-1717

**A85-092 Verification Tests of Durable Thermal Protection System Concepts.** John L. Shideler, Granville L. Webb and Claud M. Pittman, *NASA Langley Research Center* (22, 6, p. 598) Article based on AIAA Paper 84-1767

**A85-093 Missile Aerodynamics Prediction Code.** J. Sun, S. G. Hansen, R. M. Cummings and H. August, *Hughes Aircraft Company* (22, 6, p. 605) Article based on AIAA Paper 84-0389

**A85-094 High-Altitude Effects on Three-Dimensional Nonequilibrium Viscous Shock-Layer Flows.** D. J. Song and S. Swaminathan, *Virginia Polytechnic Institute and State University*; and Clark H. Lewis, *VRA, Inc.* (22, 6, p. 614) Article based on AIAA Paper 84-0304

**A85-095 Effects of Tripropellant Engines on Earth-to-Orbit Vehicles.** James A. Martin, *NASA Langley Research Center* (22, 6, p. 620) Article based on AIAA Paper 83-1178

**A85-096 Measurement of Energy Distribution in Flowing Hydrogen Microwave Plasmas.** R. Chapman, T. Morin, M. Finzel and M. C. Hawley, *Michigan State University* (22, 6, p. 626) Article based on AIAA Paper 82-1951

**A85-097 Current Collection from the Space Plasma Through Defects in Solar Array Insulation.** R. P. Stillwell and R. S. Robinson, *Colorado State University*; and H. R. Kaufman, *CoOlorado State University* (22, 6, p. 631) Article

**A85-098 Radiation Energy Receiver for Solar Propulsion Systems.** D. F. G. Rault, *McGill University* (22, 6, p. 642) Article based on AIAA Paper 83-1207

**A85-099 Frequency Characteristics of a Bubble Cluster in a Vibrated Liquid Column.** Hiroyuki, Tohoku University Hashimoto and Seiichi Sudo, *Tohoku University* (22, 6, p. 649)

**A85-100 Comparison of Theoretical and Experimental Performance of a 6.44-ft-diam Parachute.** William B. Pepper, *Sandia National Laboratories* (22, 6, p. 656) Article based on AIAA Paper 84-0802 CP843

**A85-101 Compressible Flow in a Long Tube Closed at One End.** M. D. Bennett and F. V. Wyatt, *Sandia National Laboratories* (22, 6, p. 661) Engineering Note

**A85-102 Drag Reduction of Perforated Axisymmetric Bodies in Supersonic Flow.** Eugen Serbanescu and George Savu, *The National Institute for Scientific and Technical Creation (Romania)* (22, 6, p. 663) Engineering Note

**A85-103 Transient Temperature Distributions in a Radiantly Heated Hollow Cylinder.** Y. Sakurai, *Mitsubishi Electric Corporation*; and D. K. Edwards, *University of California, Irvine* (22, 6, p. 665) Engineering Note

**A85-104 Payload Piggybacking Aboard Shuttle Solid Rocket Booster.** S. A. Stern, *University of Colorado* and F. I. Tallentire, *Martin Marietta Denver Aerospace* (22, 6, p. 668) Engineering Note